# Maths skills – M0.3 Use ratios, fractions and percentages

### Quiz – Percentages: Practice calculations

Learners may be tested on their ability to:

• Calculate percentage yields

• Calculate surface area to volume ratio

• Use scales for measuring

• Represent phenotypic ratios (monohybrid and dihybrid crosses)

1. Ventricular systole lasts for 0.3 s. The cardiac cycle lasts for 0.8 s. What percentage of the cardiac cycle is ventricular systole?
2. In an onion root tip squash, 200 cells were observed and each cell was assigned to a stage of the cell cycle. Here are the results:

|  |  |
| --- | --- |
| **Stage** | **Number of cells** |
| Interphase | 150 |
| Prophase | 20 |
| Metaphase | 12 |
| Anaphase | 4 |
| Telophase | 8 |
| Cytokinesis | 6 |

What percentage of cells were at each stage of the cell cycle?

1. A soil sample weighed 2.4 g. After heating at 100 0C in an oven to evaporate the water, it weighed 1.8 g. What percentage of the soil sample was water?
2. Stearic acid has the formula C17H35COOH. What percentage of the atoms in stearic   
   acid are:

| (a) | carbon? |  |
| --- | --- | --- |
| (b) | hydrogen? |  |
| (c) | oxygen? |  |

### Quiz – Percentage yield: Practice calculations

1. In the following examples you are given the actual yield and the theoretical yield. Calculate the percentage yield.

| (a) | Actual yield = 40 g | Theoretical yield = 60 g |  |
| --- | --- | --- | --- |
| (b) | Actual yield = 60 g | Theoretical yield = 100 g |  |
| (c) | Actual yield = 90 g | Theoretical yield = 130 g |  |
| (d) | Actual yield = 23 g | Theoretical yield = 60 g |  |

1. In the hydrolysis of a sample of triglycerides, the theoretical yield of fatty acids is 9.0 g. The actual yield was 7.2 g. What was the percentage yield for this synthesis?

### Quiz – Ratio: Practice calculations

1. Calculate the surface area-to-volume ratios of the following cuboids:

| (a) | A cuboid with sides: 2 cm x 2 cm x 2 cm |  |
| --- | --- | --- |
| (b) | A cuboid with sides: 1 m x 2 m x 4 m |  |
| (c) | A cuboid with sides: 1 mm x 1 mm x 8 mm |  |

### Quiz – Phenotypic ratio: practice calculations

1. Plants were grown either in the light or the dark and the length of the stem was measured.

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| --- | --- |
| **Growing conditions** | **Stem length (cm)** |
| Light | 10 |
| Dark | 25 |

1. What was the ratio of stem length, light to dark?

|  |
| --- |

1. What was the ratio of stem length, dark to light?

|  |
| --- |

1. The stem length experiment was repeated by growing plants under four different coloured lights:

|  |  |
| --- | --- |
| **Light used for growth** | **Stem length (cm)** |
| Blue | 25 |
| Green | 3 |
| Yellow | 10 |
| Red | 15 |

What was the ratio of stem length blue to green to yellow to red?

|  |
| --- |

1. Let’s say colour of naked mole rats is determined by a single gene and brown colour (B) is dominant to white colour (b). If two heterozygous (Bb) naked mole rats were mated, what is the expected ratio of brown naked mole rats to white naked mole rats?

|  |
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